Fodder and feed in livestock value chains in Ethiopia: Final report of the Ethiopian Livestock Feeds project

ILRI PROJECT REPORT

AMHARA REGIONAL AGRICULTURAL RESEARCH INSTITUTE

ETHIOPIAN INSTITUTE OF AGRICULTURAL RESEARCH

INTERNATIONAL CENTER FOR AGRICULTURAL RESEARCH IN THE DRY AREAS

Australian Government

Australian Centre for
International Agricultural Research

Fodder and feed in livestock value chains in Ethiopia: Final report of the Ethiopian Livestock Feeds project

William Thorpe and Alan Duncan
June 2012

ILRI works with partners worldwide to help poor people keep their farm animals alive and productive, increase and sustain their livestock and farm productivity, and find profitable markets for their animal products. ILRI's headquarters are in Nairobi, Kenya; we have a second principal campus in Addis Ababa, Ethiopia, and 14 offices in other regions of Africa and Asia. ILRI is part of the Consultative Group on International Agricultural Research (cgiar.org), which works to reduce hunger, poverty and environmental degradation in developing countries by generating and sharing relevant agricultural knowledge, technologies and policies

Editing, design and layout—ILRI Editorial and Publishing Services, Addis Ababa, Ethiopia.

Citation: Thorpe, W. and A.J. Duncan. 2012. **Fodder and feed in livestock value chains in Ethiopia: Final report of the Ethiopian Livestock Feeds project.** Addis Ababa, Ethiopia, ILRI.

International Livestock Research Institute		
P O Box 30709, Nairobi 00100, Kenya Phone + 254 20 422 3000 Email ILRI-Kenya@cgiar.org	P O Box 5689, Addis Ababa, Ethiopia Phone + 251 11 617 2000 Email ILRI-Ethiopia@cgiar.org	Offices in: Bamako . Beijing . Delhi . Hanoi . Hyderabad . Ibadan . Kampala . Maputo . Vientiane
ilri.org		

Contents

Foreword

This report is an output of a six-month project 'Fodder and feed in livestock value chains in Ethiopia – trends and prospects' commissioned by the Australian Centre for International Agricultural Research. The project was led by ILRI together with the Ethiopian Institute for Agricultural Research, the Amhara Regional Agricultural Research Institute and the International Center for Research in the Dry Areas.

The project aimed to develop a preliminary understanding of how feed components of intensifying livestock production systems in Ethiopia are changing as systems intensify and how this is reflected in the feed-related elements of focal value chains. The project outputs included three synthesis reports along with a series of field reports that can be accessed via links in the synthesis reports. This report presents an overall synthesis of project findings.

Information on the project is online at http://elfproject.wikispaces.com

Background

The Ethiopian Livestock Feeds (ELF) project, funded by ACIAR and led by ILRI, was designed to contribute to our understanding of how effective feed-based interventions can be developed to improve the livelihoods of smallholder households. A long history of animal nutrition research, feed assessment and development interventions that promote "improved" feeding technologies for smallholders, has given meagre returns, whether across the South (Owen et al, 2012) or specifically in Ethiopia (Adugna et al, 2012). Increasing domestic and export demand for livestock products, particularly meat, is an important opportunity for Ethiopia's smallholders to improve their livelihoods if effective interventions can address the feed scarcity that limits the productivity and profitability of smallholder livestock production (Adugna et al, 2012).

Livestock are integral to rural livelihoods in Ethiopia. Pastoral and agro-pastoral systems sustain the people in the arid and semi-arid areas. In the highlands, where crop-livestock systems dominate and the majority of Ethiopians live, production of staple food crops is dependent upon draught oxen, dairy products are important both for subsistence and as saleable commodities and small ruminant sales earn income and buffer shocks to household economies. As the growing population demands more livestock products, the pressure on land is intensifying, particularly in the crop-livestock systems in the highlands. Therefore, understanding how feed components of crop-livestock systems are changing as systems intensify is central to the challenges of increasing agricultural productivity, improving rural livelihoods and mitigating the environmental impacts of Ethiopia's livestock.

The Ethiopian Government and its partners are investing heavily in addressing these challenges. Example investments include the establishment of the Agricultural Transformation Agency (ATA) and the multi-donor funded Agricultural Growth Programme (AGP) within the Ministry of Agriculture, the CIDA-funded Livestock Value Chain Enhancement (LIVES) project, the Gates-funded East Africa Dairy Development Project (Phase 2: EADD2) and the CGIAR Research Programme 3.7, 'More milk, meat and fish, for and by the poor' (CRP3.7). The latter will involve research for development to upgrade the small ruminant value chain. The Ethiopia Institute for Agricultural Research (EIAR), the Regional Agricultural Research Institutes (RARI) and their university counterparts are key partners in these initiatives. Refining and making available to these organisations and programmes methods and tools that assess feed resources in smallholder systems and help identify effective feed intervention strategies that support intensification to the benefit of smallholders, was the goal of the ELF project

Project objective and outputs

In the context of seeking to understand how feed components of livestock production systems in Ethiopia are changing as systems intensify and how this is reflected in the feed-related elements of focal value chains, the **Purpose** of the ELF project was to:

- Develop a preliminary understanding of how feed components of intensifying livestock production systems in Ethiopia are changing as systems intensify and how this is reflected in the feed-related elements of focal value chains.

In practical terms the project aimed to:

- Develop refined tools for rapid assessment of feed resources to allow effective feed intervention strategies to support intensification of livestock production in value chains benefiting smallholder producers.

To achieve that objective, the project produced six **Outputs:**

- Refined tools for feed resource assessment (FEAST), rapid market appraisal and value chain analysis (value chain assessment; VCA), and feed technology prioritization (Techfit);
- Targeted value chain assessment of feed elements of dairy, beef and sheep value chains;
- Data base of price, quality and volume data on a seasonal basis for key feeds associated with the target value chains;
- Synthesis of experiences with successful small ruminant feeding strategies from elsewhere and their local applicability;
- Assessment of feed availability and demand for small ruminant production in Menz area;
- Synthesis workshop.

How the Outputs were delivered

The planning and the reporting of the activities that delivered the Outputs were facilitated by the use of a wiki-space http://elfproject.wikispaces.com through which the project's processes and results were shared with the implementing partners and others interested in the project. The content of the Project's Inception Workshop, the full report of the end-of-Project Synthesis Workshop (Output 6) and the other Project reports can be found on the wiki.

Staff of the EIAR, the Amhara Regional Agricultural Research Institute (ARARI) and ICARDA were the key partners with whom the activities were implemented. The field testing and refinement of the VCA, FEAST and Techfit tools and its reports (Outputs 1 and 2) were complemented by the three other Outputs: the "Feed data base study" (3); the "Desk study of small ruminant feeding strategies" (4) and, the "Feed resources assessment in the Menz area" (5). Along with the tools these three Outputs were designed to inform the development of feed intervention strategies in value chains benefiting smallholder producers, with a focus on sheep and goats (small ruminants; SR). The sixth Output was the end-of-Project Synthesis Workshop.

With support from ILRI staff and national consultants, the EIAR and ARARI staff led the field testing of the tools (Outputs 1 and 2); a national consultant with support from ILRI staff prepared the Feed data base (output 3); an international consultant supported by ILRI and ICARDA staff prepared the desk study (Output 4); and ILRI staff carried out the Menz feed assessment (Output 5).

Feed dataset study: The study addressed Project Output 3: "Data-base of price, quality and volume on a seasonal basis for key feeds associated with the target value chains". The draft dataset is here. During the end-of-Project Workshop the presentation of the study highlighted the dynamics of smallholder livestock production in Ethiopia, its emerging market orientation, the increasing use of purchased feed and the need for information on feed quality and prices for making decisions to purchase feed ingredients and to formulate balanced diets. The proposed dataset showed how it better organized and refined the information on nutritive value of feeds and on price variability and trends. It was noted that the data set needed further enriching and that it will require updating regularly with current market information that captures seasonal variability. Analysis of the dataset is planned to assess price quality relationships for different nutrients, temporal trends in feed prices and comparison with other similar datasets, e.g. from ILRI's India programme.

The discussion during the end-of-Project Workshop asked how the dataset format could be integrated into the existing Ethiopia market information system and what practical mechanisms could capture the wide variability in feed quality and prices amongst locations and seasons. The challenge was to develop the dataset in a tabular format to support decision-making at kebele, farm and enterprise levels. The on-going USAID-funded, ILRI-led Quick Feeds Project will continue the development of the dataset and it will explore the operational issues of maintaining an effective service within Ethiopia's emerging market information system.

Desk study of small ruminant feeding strategies: The study (link to report) addressed Project Output 4: "Synthesis of experiences with successful small ruminant feeding strategies from elsewhere and their local applicability". It took a three-pronged approach which combined the authors' knowledge of current & past R&D activities, an electronic search of global literature and feedback from key informants in the South. The conclusions were consistent with those from the recent FAO electronic conference "*Successes and failures with animal nutrition practices and technologies in developing countries"* in that while there were many theoretical options for improved feeding strategies for small ruminant meat production, there had been limited uptake by smallholders. This highlighted the need for farmer participatory, action-research like that in CIAT's SE Asia programme. Understanding both livelihood systems -including gender and labour issues and coping and risk management strategies- and small ruminant value chains, will be important. Possible entry-points in the production cycle and interactions with, e.g., disease constraints, were discussed. Promising ways of improving SR-based livelihoods through feed interventions were enhancing fattening/finishing and improving reproductive rates. Given current production systems and feed scarcities in Ethiopia and the increasing use of crop residues, it was suggested that "smart feeding" (ration formulation) to improve the efficiency of utilization of available feeds, community-based management of common property resources, food-feed crop improvement and planted forages for stall-feeding, would be important strategies provided that they were well targeted. The study concluded that close collaboration of research and development staff working with smallholders to prioritize interventions using the participatory approaches and tools tested in ELF and related projects, was needed if the previous lack of R&D impact was to be reversed.

Feed resources assessment in the Menz area: The study addressed Project Output 5: "Assessment of feed availability and demand for small ruminant production in Menz area". The report (link to report) describes the study area, its extensive sheep production systems and the study's objectives of estimating at the meso-scale feed demand, availability and management, and their potential implications for feed-based interventions. The analysis considered two woredas with livelihood systems based respectively on "Barley, legume, sheep" and "Cereals, legumes, livestock". The estimates of feed supply and demand drew on land use/cover and livestock data from GIS and other secondary data sources. The discussion centred on the large negative estimate of feed balance and the high estimate of "over-stocking", which probably resulted from the imprecision of the data (especially feed supply), errors in biomass and livestock coefficients and issues related to seasonal variation. Estimates more in line with field reality may be possible by estimating available feed supply from current livestock production. It was suggested that a scenario (rather than a feed-balance) approach will be more useful for informing land use and other agricultural policies and strategies.

Table 1: *The woredas and kebeles and their crop-livestock (CL) characteristics for testing the VCA, FEAST and Techfit tools*

Value Chain	Woreda[1]	Kebele[2]	CL Characteristics[3]
BEEF	Adama*	Kechema	Teff, wheat, maize, barley, beans and peas; planted forages; local cattle[4]; SR[5]; donkeys; some beef fattening; some labour income
		Wonji Kuriftu	Some irrigation; teff, wheat, maize, barley, beans; planted forages; local cattle[4]; some beef fattening; some dairy crosses; SR; donkey
	Arsi Negelle	Ali-Wayo	Teff, wheat, maize, barley; vetch; local cattle[4]; SR; donkey; half HH[6] beef fattening; some business income
		Kersa-Ilala	Teff, wheat, maize, potato; local cattle[4]; some beef fattening; few SR; donkey; some labour income; livestock main income
DAIRY (fluid milk)	Wolmera*	Berfeta Tokofa	Teff, wheat, chick & grass peas, lentils; irrigated potato, cabbage, carrots; local cattle, donkeys & horse; main income horticulture.
		Rob Gebeya	Teff, wheat, beans; dairy crosses, local cattle; horses; main income dairy.
	Wuchale	Mechela Wertu	40% landless HHs; wheat, teff, oats, common beans; irrigated potato, cabbage, carrots; local cattle – cows & fattening; some dairy crosses; horses; fattening cattle main income source.
		Bosoqa Jate	15% landless HHs; wheat, teff, barley, common beans, chickpea, lentils, grass pea; no irrigation; dairy crosses, sheep, donkeys, local cattle; dairy cattle main income source.
SHEEP MEAT	Angolela-Tera*	Chefanen	Some irrigation; barley, broad/faba beans, wheat, lentils, linseed; sheep, local cattle (some fattening), some dairy crosses; livestock main income.
		Chacha	
	Menz-Gera	Dargegene	Barley, broad/faba beans, wheat, oats, lentils; sheep, some local cattle; sheep main income source.
		Sina Amba	

1 VCA for the livestock product and for feed was carried out in the woreda (district) shown with *;

2 FEAST and Techfit were applied in both kebeles (villages) in a district; 3 All rain-fed cropping unless stated otherwise; 4 Draught and milk production; 5 SR small ruminants; 6 HH Households.

Testing the tools: The core of the Project was the field testing and refinement of the three tools: VCA (value chain assessment) for the rapid market appraisal and value chain analysis; FEAST for the appraisal of livestock production systems and the feed resource assessment; and Techfit for prioritization of feed technologies. The templates are available through the links on the wiki. As was explained in the Project documentation, FEAST and Techfit were developed and had undergone preliminary testing in on-going programmes by ILRI in partnership with CIAT and national organizations in Asia and East Africa. The VCA checklist built upon recent experiences of value chain analysis in Ethiopia and the survey instrument from EADD Phase 1.

In order to field test and refine the VCA, FEAST and Techfit tools, six districts/woredas, two for each of the dairy, beef and sheep meat value chains, were selected by the partners during the Project Inception Workshop in February. In each VC two districts, with variation in production systems, were selected and, within each district, two villages/ kebeles, one close to and the other more distant from urban markets. The design, which captured variation in final products, their production systems and market access and participation, was expected to provide an effective test of the sensitivity and robustness of the three tools. **Table 1** describes the testing sites.

Working closely with field staff of the Ministry of Agriculture, Debre Berhan Agricultural Research Center (ARC) applied and reported the testing of the three tools in the sheep meat value chain, Debre Zeit ARC was responsible for the testing in the beef value chain and Holetta ARC for testing in the fluid milk chain. Their presentations at the end-of-Project Workshop (synthesis workshop) and the detailed VCA, FEAST and Techfit reports for each of the livestock value chains and their feed chains are available on the wiki (FEAST and Techfit reports here and VCA reports here)

During the Workshop the field testing was discussed in breakout groups by tool –VCA, FEAST and Techfit, and in a group addressing their integration and synergies. The groups were asked to list the strengths and weaknesses of the tools, which were discussed and revised in plenary and the results presented in the Synthesis Workshop report. In addition, during the final session of the Workshop, potential clients for the tools, drawn from national and international agricultural R&D organizations in Ethiopia, were invited to give their feedback on the utility of the tools and their application in wider contexts.

Lessons learned

The lessons from the field-testing, the feedback from the breakout groups and the plenary discussion in the Synthesis Workshop highlighted the positive responses from the application of the three tools and how their use had informed the assessment of available feed resources and the options for feed-based interventions. An important contribution was how the use of the tools served to stimulate productive interactions amongst livestock producers, other actors in the three livestock-product value chains and the R&D staff. The Workshop discussants noted how the tools should be further strengthened and refined and pointed out the challenges faced in incorporating their use as an integral part of R&D activities supporting smallholder livestock development and feed-based interventions.

In his closing remarks to the Workshop Alan Duncan, the Project Leader, reflected on the importance of context specificity resulting from the contrasting characteristics amongst kebeles/villages in a woreda/district (Table 1), and the variation amongst households within kebeles/ villages, that emerged from the field exercises. The context specificity highlighted the need for more engagement by R&D agencies with farmers and the other actors in livestock-product value chains and for a systematic approach to these interactions. While the field-testing had confirmed that the suite of tools, VCA, FEAST and Techfit provided a useful diagnostic approach that can lead to action through the better targeting of feed-based interventions, the immediate challenges were to establish ways of institutionalizing the application of the tools and to ensure that their refinement is a continuing dynamic process. Furthermore, there is a need to look at ways of turning the proposed interventions emerging from application of the tools into tangible activities on the ground for the benefit of livestock keepers.

Specific issues and topics to address include:

- Scale of applicability of the results –using agro-ecological zones rather than administrative boundaries as recommend domains, yet the difficulty arising from the apparent large variation amongst and within villages/kebeles;
- Within the structure and content of the tools, how to better take account of the seasonality of feed supply (especially related to cropping patterns and crop residue/by-product management) and the seasonality of demand for livestock products;
- How to capture (and disseminate) the related variation in prices of feed inputs and livestock products;

- Within the tools, how to better assess water as a possible limiting nutrient in the production of crops and livestock;
- How to learn from past R&D successes and failures, whether in a region, zone, woreda or kebele, and capture the lessons in VCA and FEAST and build upon the experiences when applying Techfit;
- Be inclusive by working with: men and women; large and small-scale producers; public and private sectors, NGOs; crop and livestock specialists; input and output market agents; processors of crop and livestock products;
- Building knowledge and strengthening skills: identify and train those who will be the key users of VCA, FEAST and Techfit for the systematic diagnosis of feed constraints and the identification and better targeting of effective feed-based interventions;
- How can this be investment in knowledge and skills for improving feeding strategies be integrated into, or be complementary to, on-going development programmes/projects like ATA, AGP, LIVES and EADD2?

Way forward

As mentioned earlier, the immediate route for building upon the outputs of ELF is through the complementary activities of the on-going USAID-funded, ILRI-led Quick Feeds Project. The project benefits from the same leadership as ELF and strong links to EADD2 and CRP3.7. In addition there is good potential for the integration of the 'ELF' tools and approaches within LIVES and the possibility of contributing significantly to AGP.

Therefore, subject to its receiving adequate support from MoA, EIAR and the RARIs, there is good reason to be optimistic about achieving the widespread application of the VCA, FEAST and Techfit tools within Ethiopia. The experiences of the ELF Project show that the application of the tools should lead to more effective feed intervention strategies and improvements in the productivity and profitability of smallholder livestock production and of rural livelihoods.

References

Adugna Tolera, Alemu Yami, Alemayehu Mengistu, Dawit Alemu, Diriba Geleti, Getnet Assefa, Lemma Gizachew, Seyoum Bediye and Yirdaw Woldesemayat. 2012. *Livestock Feed Resources in Ethiopia: Challenges, Opportunities and the Need for Transformation.* National Feed Committee Report, Ethiopian Animal Feed Industry Association (EAFIA) and the Ministry of Agriculture and Rural Development (MoARD), Addis Ababa, Ethiopia. xxxpp. (*In press*)

Anon. 2012. http://elfproject.wikispaces.com

Owen, E., Smith, T. and Makkar, H. 2012. Successes and failures with animal nutrition practices and technologies in developing countries: A synthesis of an FAO e-conference. Anim. Feed Sci. Tech. 174: 211– 226

The International Livestock Research Institute (ILRI) works to enhance the roles livestock play in pathways out of poverty in developing countries. ILRI is a member of the CGIAR Consortium, a global research partnership of 15 centres working with many partners for a food-secure future. ILRI has two main campuses in East Africa and other hubs in East, West and southern Africa and South, Southeast and East Asia. ilri.org

CGIAR is a global agricultural research partnership for a food-secure future. Its science is carried out by15 research centres that are members of the CGIAR Consortium in collaboration with hundreds of partner organizations. cgiar.org